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Total No. of Pages : 3

T.E. (Civil) (Semester - VI) Examination, April - 2016
STRUCTURAL MECHANICS - III (Pre-Revised)
Sub. Code : 45542

Day and Date : Saturday, 16 - 04 - 2016 **Total Marks : 100**

Time : 03.00 p.m. to 06.00 p.m.

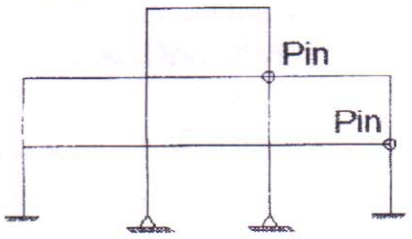
Instructions:
1) **Attempt any three questions, each from section - I and from section - II independantly.**
2) **Figures to the right indicate full marks.**
3) **Use of non-programmable calculators is allowed.**
4) **Assume any suitable data if required and missing, and state it clearly.**

SECTION - I

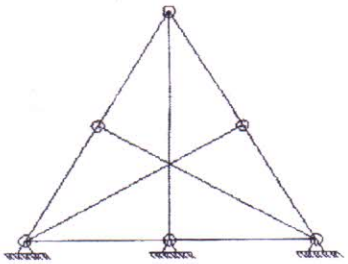
Q1) a) Estimate the static and kinematic indeterminacies of the following structures. **[6]**

Q 1. a) i

Q 1. a) ii



Q 1. a) iii



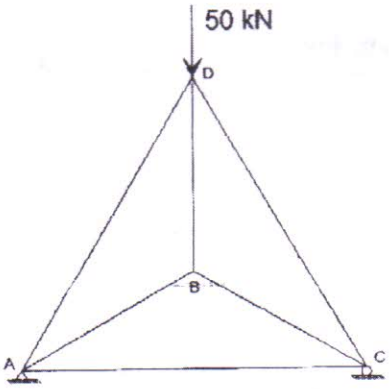
b) Locate the point of maximum span moment for a propped cantilever of span 6 metres and overhang 2 metres subjected to a udl of 20 kN/m over its entire length. Use method of consistent deformation for the analysis. (The magnitude of maximum span moment need not be determined.)**[10]**

P.T.O.

Q2) Find the end-moments using force method, for a fixed beam of length 6 metres, loaded with a point load of 45 kN at 1.5 metres from the right fixed end along with an uniformly distributed load of 15 kN/m spread over the left half span of the beam. **[17]**

Q3) A continuous beam ABCDE is loaded by an udl of intensity 46 kN/m in the portion AC and a load of 20 kN at the point E. Overhangs AB and DE are of lengths 1 m and 1.5 metre respectively. Spans BC and CD are of 4m and 2m resp. And have inertia in the ratio 11:7. Analyse the beam by using Clapeyron's theorem, to find all reaction and draw SFD and BMD. **[17]**

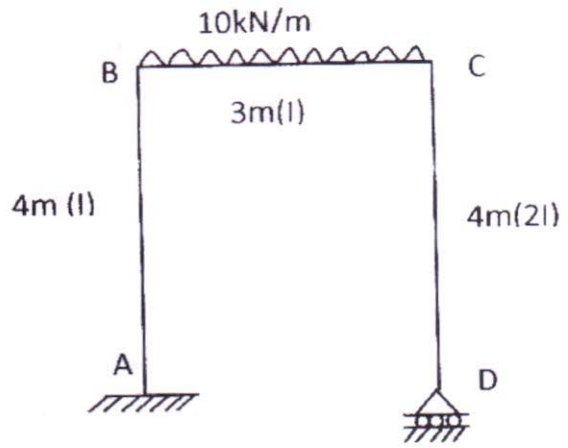
Q4) Find all member forces for the redundant truss loaded and supported as shown in the figure. The external members form an equilateral triangle of side 2 metres whereas the internal members bisect the angle between its two adjacent external members. Axial rigidity of all members is proportional to the length of member. **[16]**



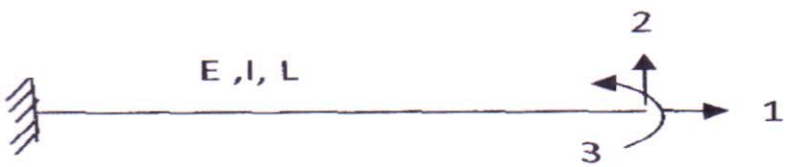
SECTION - II

Q5) A continuous beam ABCD 8m long is fixed at A and simply supported at B and C, such that AB= 4m, BC=3m and overhang CD =lm. It carries point of 2kN and 0.5kN at 1m from A and at D respectively, also subjected to clockwise moment 2kNm at 1m from B in span BC. Analyze the beam by using slope deflection method. Draw BMD . Assume uniform flexural rigidity. **[16]**

Q6) Analyse the frame shown in figure by moment distribution method. Draw BMD. Take E = 200 × 10^6kN/mm^2 and I = 100 × 10^3mm^4 **[17]**



Q7) a) Generate the flexibility matrix [F] for coordinates 1, 2 and 3 of the cantilever beam shown in figure. **[5]**



b) A continuous beam ABC is fixed at A and simply supported at B and C, such that AB= 8m, BC=8m. It subjected to point load 100kN and 60kN at midspan of AB and BC respectively. Analyse the beam using flexibility matrix method. Draw BMD. **[12]**

Q8) A continuous beam loaded and supported as shown in figure, during loading support B sinks by 10mm. Analyze the beam by using stiffness matrix method.**[16]**